



Lesson 2.2 – Dimensions and Tolerances

Concepts

1. Working drawings should contain only the dimensions that are necessary to build and inspect an object.
2. Object features require specialized dimensions and symbols to communicate technical information, such as size.
3. There is always a degree of variation between the actual manufactured object and its dimensioned drawing.
4. Engineers specify tolerances to indicate the amount of dimensional variation that may occur without adversely affecting an object's function.
5. Tolerances for mating part features are determined by the type of fit.

Performance Objectives

It is expected that students will:

- Explain the differences between size and location dimensions.
- Differentiate between datum dimensioning and chain dimensioning.
- Identify and dimension fillets, rounds, diameters, chamfers, holes, slots, and screw threads in orthographic projection drawings.
- Explain the rules that are associated with the application of dimensions to multiview drawings.
- Identify, sketch, and explain the difference between general tolerances, limit dimensions, unilateral, and bilateral tolerances.
- Differentiate between clearance and interference fits.

Essential Questions

1. What is a working drawing?
2. What are dimensioning standards and how are they used?
3. What determines the location of the origin or datum from which all of the edges and features of an object are dimensioned?
4. What is a tolerance?
5. What effect can trailing zeroes in the dimension text have on the cost of a part?
6. Why is it necessary to use common units on a drawing for all dimensions?

Key Terms

Aligned Dimension	American National Standards Institute (ANSI)	American Society of Mechanical Engineers (ASME)
Arrowheads	Baseline Dimensioning	Bilateral Tolerance
Chain Dimensioning	Datum	Datum Dimension
Dimension	Dimension Lines	Dual Dimensions
Extension Lines	General Notes	Leaders
Least Material Condition (LMC)	Limits of Dimension	Local Notes
Location Dimension	Maximum Material Condition (MMC)	Nominal Size
Reference Dimension	Size Dimensions	Tolerance
Unidirectional Dimension	Unilateral Tolerance	Working Drawings

Instructional Resources

PowerPoint Presentations

[Dimension Guidelines](#)
[Dimensioning Standards](#)
[Tolerances](#)

Word Documents

[Activity 2.2.1 What Is Wrong with this Picture?](#)
[Activity 2.2.2 Model Dimensioning](#)
[Activity 2.2.2a General Rules for Dimensioning](#)
[Activity 2.2.3 Tolerances](#)
[Lesson 2.2 Key Terms and definitions in Excel](#)

Reference Sources

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